DOCUMENT RESUME

ED 082 160 CS 000 753

AUTHOR Sehulster, Jerome R.; And Others
TITLE Loss of Retrieval Information in Prose Recall.
PUB DATE Feb 73
NOTE 7p.; Paper presented at the Annual Meeting of the American Educational Research Ass. (New Orleans, Feb. 26-Mar. 1, 1973)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Cognitive Processes; College Students; *Cues; Learning; *Learning Processes; *Memory; *Recall (Psychological); Retention

ABSTRACT

The purpose of this research was to experimentally manipulate input and output orders of information and separate storage and retrieval components of prose free recall. The cued partial recall method, used in word list recall, was adapted to a prose learning task. Four short biographical stories of about 55 words each were systematically combined into four larger passages such that each story appeared once in the four possible serial positions of stories. Each story contained six facts about a fictional person. A total of 48 subjects from a basic psychology class were given two and one half minutes to read a passage. Recall followed immediately and subjects were required to recall as much factual information as possible from one story before turning a page to recall material from another story. The cue used to constrain recall order was the name of the person described in the particular story. Subjects were given unlimited time for recall. The results indicated that the primacy effect in prose free recall is the result of order of recall as well as order of input of information. The primacy effect in prose free recall may be the result of output interference affecting the efficient use of retrieval information. (WR)

ED 082160

Presented at A.E.R.A., New Orleans, February, 1973.

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Jerome R. Sehulster, John P. McLaughlin, and James H. Crouse
University of Delaware

Loss of retrieval information in prose recall

Sehulster and Crouse (1972) observed that subjects in prose free recall recalled more facts or nouns from the beginning of the passage than from any other quarter of the passage. The primacy effect implied that an appropriate set of retrieval cues was in memory and was allowing access to this beginning information. This focus on retrieval cues was suggested by the results of a separate group which was provided with retrieval cues in the form of questions to elicit recall. Their recall was higher than that of free recall and no consistent serial effects were observed.

It was the purpose of this research to examine the primacy effect in free recall more closely. What factors affect the implimentation of later retrieval cue sets and where in the course of reading and recall do these factors operate? On the one hand, it is possible that the primacy effect is determined by factors operating during the storage or input of the beginning of the passage. Murdock (1962), for example, has suggested that the primacy effect could be the result of material stored in the absence of proactive inhibition. On the other hand, the primacy effect could be the result of factors at work during retrieval. It has been shown that the recall of items may interfere with the subsequent recall of other items (Tulving and Arbuckle, 1963).

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It was impossible to isolate storage and retrieval components in the Sehulster and Crouse (1972) study since, as in typical prose free recall, the subject began recall at the beginning of the passage and followed the sequence of the passage (c.f. Deese and Kaufman, 1957). Any effects due to the input order of information were confounded with effects due to the output order of information under these conditions of typical free recall. It was the purpose of this study to experimentally manipulate input and output orders of information and separate storage and retrieval components of prose free recall.

To accomplish this, the cued partial recall method, used in word list recall (Dong, 1969), was adapted to a prose learning task. Four short biographical stories of about 55 words each were systematically combined into four larger passages such that each story appeared once in the four possible serial positions of stories. Each story contained six facts about a fictional person.

Each subject read one four story passage and was then required to recall the information in one of four recall orders. These four orders were generated such that one recall order was identical to the input order of the stories in the passage and one recall order was the reverse of the input order. Two other recall orders were constructed to fill a latin square. A story from each input serial position was recalled at each possible output serial position.

Materials were combined into booklets which were distributed randomly. A total of 48 subjects were used from a basic psychology class. Two and one half minutes were given for reading the passage.

Recall followed immediately. Subjects were required to recall as much factual information as possible from one story before turning a page to recall material from another story. The cue used to constrain recall order was the name of the person described in the particular story. Subjects were given unlimited time for recall.

Recall was scored by counting the number of preselected nouns that appeared in the free recall protocols. Scoring was lenient in cases of misspelling and context placement. A latin square analysis of variance indicated that the position of a story in the passage affected its subsequent recall. The story that was read, or stored, first was recalled significantly better than the story that was stored last ($p<.01$). This finding replicates our earlier study (Sehulster and Crouse, 1972). However, a story's position in the output order also affected recall. The story that was recalled, or retrieved, first was recalled significantly better than the story that was recalled last ($p<.01$).

A further separation of these data was undertaken. Recall for stories from the first input serial position was examined as a function of output order, as was recall for stories from the second input position, third input position, and fourth input position. These data are presented in the handout. Separate analyses were performed on input scores at each output position. Recall from the first and second input position was greater than that of the fourth input position at the third output position. At the fourth output position, recall from the first input position was significantly greater than that from the third and fourth input positions. These

differences were confirmed by Newman Keuls tests and were significant at the .01 level.

The results of this study indicate that the primacy effect in prose free recall is the result of order of recall as well as order of input of information. As can be seen, in normal free recall the first portion of a passage would be recalled first, the second portion second, and so on. The fourth portion of the passage, which apparently suffers most from interpolated recall, would be recalled last, thus yielding the primacy effect.

Based on earlier question-recall results (Sehulster and Crouse, 1972), it was assumed that the poorer recall for latter portions of the passage reflected a retrieval failure of some kind. The factual information was available in memory, but not accessible (e.g. Tulving and Pearlstone, 1966). Continuing this line of argument, then, what factors are responsible for the loss of retrieval information for the final portions of the passage? We posit two interacting factors.

First, output interference (e.g. Tulving and Arbuckle, 1963) may be the cause of disintegration of retrieval information for later outputs. As the subject recalls information early in the recall task, he loses the ability to efficiently retrieve other information. The free recall of prose, which involves much activity in terms of retrieval, organization, and writing, seems particularly susceptible to this output interference..

Retrieval information for early inputs seems to be more resistant to the effects of output interference than the retrieval infor-

mation for later inputs. It is possible here that proactive interference, the second factor, affects the storage of retrieval information during input. As the subject reads later portions of the passage, he is storing retrieval information in a less stable fashion than earlier portions. That he has stored this retrieval information at all is evidenced by high recall of all portions of the passage at first output. That retrieval information for later portions of the passage is less stable is evidenced by the detrimental effect of interpolated recall.

In summary, the primacy effect in prose free recall may be the result of output interference affecting the efficient use of retrieval information. Proactive interference from the storing of retrieval information from early portions of the passage may affect the stability of later retrieval information in memory, thus making it more susceptible to output interference. This interaction of proactive interference and output interference has also been suggested by Postman (Postman and Hasher, 1972). Further research is being conducted to assess the nature of the retrieval information in prose.

February 26, 1973

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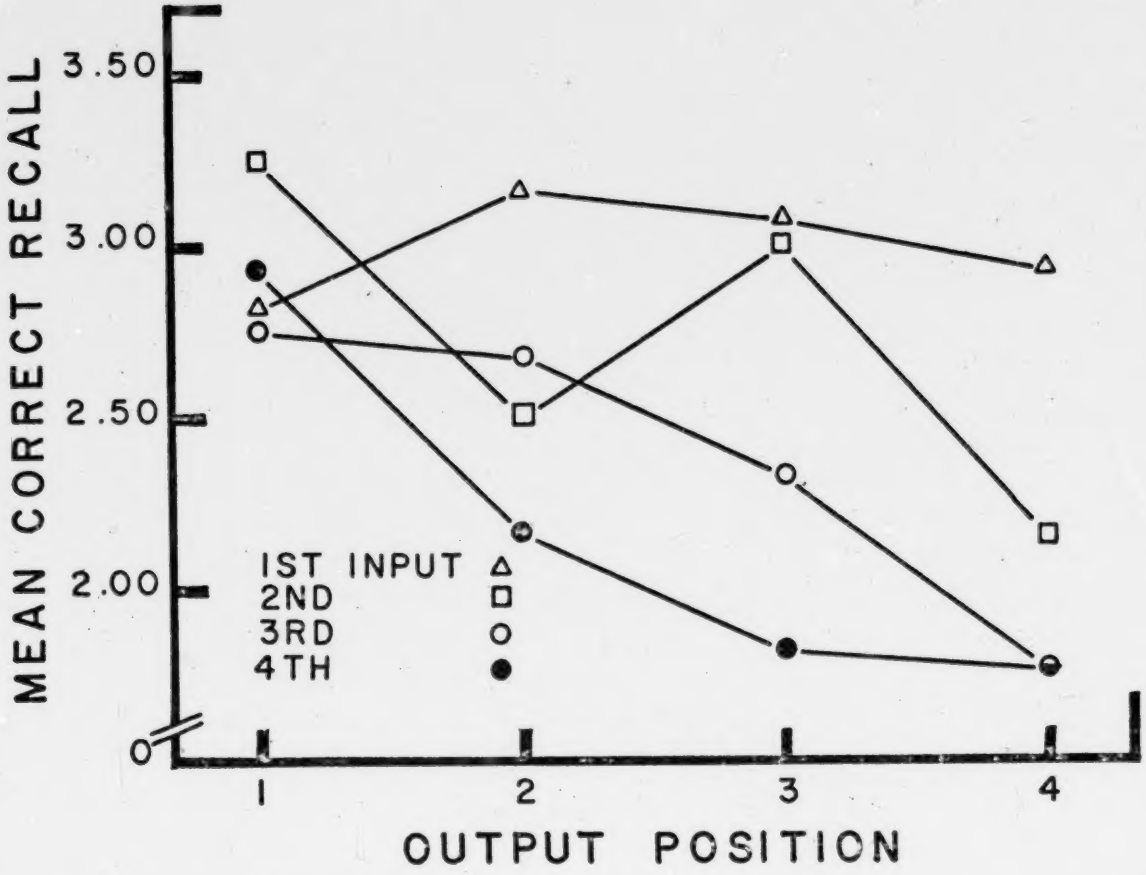

Free recall: Mean level of recall of facts for stories from the four input positions of the passage as a function of output position in the recall order.

Fig 2